

AD-A269 475



2
HJ

DODPOPHM/USA/DOD/NADTR93112

PERFORMANCE ORIENTED PACKAGING TESTING
OF
PPP-B-621 WOOD BOX FOR
M1A2 CRYPTOGRAPHIC EQUIPMENT DESTROYER
FOR PACKING GROUP II SOLID HAZARDOUS MATERIALS

DTIC
ELECTE
SEP 20 1993
S A D

Author:
Kerry J. Libbert
Mechanical Engineer

Performing Activity:
Naval Surface Warfare Center
Code 4045
Crane, Indiana 47522-5001

Date
August 1993

This document has been approved
for public release and sale; its
distribution is unlimited.

FINAL

DISTRIBUTION UNLIMITED

Sponsoring Organization:
Naval Surface Warfare Center
Code 4027
Crane, Indiana 47522-5001

93 9 16 08 7

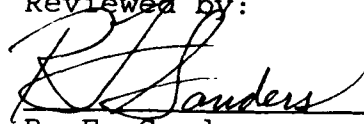
93-21722



Prepared by:


K. J. Libbert

Reviewed by:


R. F. Sanders

Reviewed by:


J. W. Puckett

Approved by:


D. N. Montgomery

REPORT DOCUMENTATION PAGE		Form Approved OMB No 0704-0188	
Public reporting burden of this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.			
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE August 1993	3. REPORT TYPE AND DATES COVERED POP Test	
4. TITLE AND SUBTITLE Performance Oriented Packaging Testing of PPP-B-621 Wood Box for M1A2 Cryptographic Equipment Destroyer for Packing Group II Solid Hazardous Materials		5. FUNDING NUMBERS	
6. AUTHOR(S) Kerry J. Libbert			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Surface Warfare Center Packaging and Plastics Applications Branch (Code 4045) 300 Highway 361 Crane, Indiana 47522-5001		8. PERFORMING ORGANIZATION REPORT NUMBER DODPOPHM/USA/DOD/NADTR93112	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Naval Surface Warfare Center Pyrotechnics/Demolition Branch (Code 4027) 300 Highway 361 Crane, Indiana 47522-5001		10. SPONSORING/MONITORING AGENCY REPORT NUMBER Same as above	
11. SUPPLEMENTARY NOTES N/A			
12a. DISTRIBUTION/AVAILABILITY STATEMENT Unlimited distribution		12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) Qualification tests were performed to determine whether the in-service PPP-B-621 wood box used for shipping and storage of M1A2 cryptographic equipment destroyers could be utilized to contain properly dunnaged solid type hazardous materials weighing up to a gross weight of 24 kg (53 pounds). The tests were conducted in accordance with Performance Oriented Packaging (POP) requirements specified by the United Nations Recommendations on the Transportation of Dangerous Goods, ST/SG/AC.10/1 and the Code of Federal Regulations, Title 49 CFR, Parts 107 through 178. The PPP-B-621 wood box has conformed to the POP performance requirements; i.e., the box successfully retained its contents throughout the specified tests.			
14. SUBJECT TERMS POP Test of PPP-B-621 Wood Box for M1A2 Cryptographic Equipment Destroyer		15. NUMBER OF PAGES 7	
		16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UL	19. SECURITY CLASSIFICATION OF ABSTRACT UL	20. LIMITATION OF ABSTRACT UL

INTRODUCTION

This Performance Oriented Packaging (POP) test was performed to ascertain whether the PPP-B-621 wood box used for shipping and storage of the M1A2 Cryptographic Equipment Destroyer meets the Packing Group II requirements specified by the Code of Federal Regulations, Title 49 CFR, Parts 107 through 178, dated 31 December 1991. The objectives were to evaluate the adequacy of the container in protecting the hazardous materials.

The box tested conforms to PPP-B-621, Class 2, Grade A and contains one equipment destroyer. Two steel straps were used to secure the wood box during the tests. The box is shown, as tested, in figure 1.

TESTS PERFORMED

1. Drop Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.603. One container was used for each drop orientation. The drop height was 1.2 meters and the drop sequence was as follows:

- a. Flat on Bottom
- b. Flat on Top
- c. Flat on Long Side
- d. Flat on Short Side
- e. One Corner

The test was performed at ambient temperature ($70^{\circ} \pm 20^{\circ}\text{F}$). The contents of the container should be retained within its packaging and exhibit no damage liable to affect safety during transport.

2. Stacking Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.606. Three different containers were used, each with a stack weight of 2860 pounds. This represents the weight imposed on the bottom container of a sixteen-foot stack of like containers weighing 53 pounds each. The test was performed for 24 hours. After the allowed time, the weight was removed and the container examined. Any leakage, deterioration, or distortion which could adversely affect transport or reduce its strength or cause instability in stacks of packages is cause for rejection.

3. Base Level Vibration Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.608. Three sample containers were loaded with aluminum weights and foam and closed as for shipment. Each container was placed on a vibrating platform that had a vertical double-amplitude (peak-to-peak displacement) of one



Figure 1. ppp-B-621 wood box for
MLA2 Cryptographic Equipment
Destroyer before POP test.

Reproduced From
Best Available Copy

inch. The packages were constrained horizontally to prevent them from falling off the platform, but were free to move vertically, bounce and rotate. The test was performed for one hour at a frequency that caused each point of the container bottom to be raised from the platform 1.6 mm. A 1.6 mm thick metal strip was passed between the bottom of the container and the platform.

PASS/FAIL

1. Drop Test

The criteria for passing the drop test is outlined in Title 49 CFR, Part 178, Subpart M, Sec. 178.603(f): A package is considered to successfully pass the drop test if for each sample tested, no rupture occurs which would permit spillage of loose explosive substances or articles from the outer packaging.

2. Stacking Test

The criteria for passing the stacking test is outlined in Title 49 CFR, Part 178, Subpart M, Sec. 178.606: No test sample may show any deterioration which could adversely affect transportation safety or any distortion likely to reduce its strength, cause instability in stacks of packages, or cause damage to inner packagings likely to reduce safety in transportation.

3. Base Level Vibration Test

The criteria for passing the Base Level Vibration Test is outlined Title 49 CFR, Part 178, Subpart M, Sec. 178.608: Immediately following the period of vibration, each package must be removed from the platform, turned on its side and observed for any evidence of leakage. A packaging passes the vibration test if there is no rupture or leakage from any of the packages. No test sample should show any deterioration which could adversely affect transportation safety or any distortion liable to reduce packaging strength.

TEST RESULTS

1. Drop Test

Satisfactory.

2. Stacking Test

Satisfactory.

3. Base Level Vibration Test

Satisfactory.

DISCUSSION

1. Drop Test

After each drop the container was inspected for any damage which would be cause for rejection. The flat drops caused no visible damage, and the corner drop only flattened the impacted corner, as shown figure 2. In all cases, the container remained intact and there was no spillage of contents.

2. Stacking Test

Three containers were individually tested. Each container was visibly inspected after the 24-hour period was over. There was no leakage, distortion, or deterioration of the container as a result of this test.

3. Base Level Vibration Test

Immediately following the vibration test, each container was removed from the platform, turned on its side and observed for any evidence of leakage. All containers remained securely closed and there was no evidence of leakage of contents.

REFERENCE MATERIAL

Code of Federal Regulations Title 49 CFR, Parts 107-178.

Reproduced From
Best Available Copy

DISTRIBUTION LIST

Commander
Crane Division
Naval Surface Warfare Center
Code 4045 and Code 4027
Crane, IN 47522-5000

Commanding Officer
Naval Weapons Station Earle
Code 50 and Code 50232
Colts Neck, NJ 07722-5000

Defense Technical Information Center (2 copies)
ATTN: DTIC/FDAC (Virginia Guidi)
Bldg. 5, Cameron Station
Alexandria, VA 22304-6145

Commander
U.S. Army Armament, Research, Development and Engineering
Center
SMCAR-ESK
Rock Island, IL 61299-7300

Defense General Supply Center
DDRV-TMPA (Dave Gay)
Richmond, VA 23297-5000

DATA SHEET

CONTAINER: PPP-B-621 Wood Box for M1A2 Cryptographic Equipment Destroyer	POP MARKING: <div style="display: inline-block; border: 1px solid black; border-radius: 50%; padding: 2px; text-align: center;">u n</div> 4C1/Y24/S/** USA/DOD/NAD
Type: 4C1	UN Code: 1.3G
Specification Number: PPP-B-621	Material: Wood
Gross Weight: 24 kg (53.0 pounds)	Dimensions: .72m L x .50m W x .08m H (28.38" L x 19.62" W x 3.38" H)
Closure (Method/type): 2 Steel straps	Tare Weight: 4.2 kg (9.2 pounds)
Additional Description: One equipment destroyer is packed in a fiberboard box in accordance with Drawing 10001-2128020. One fiberboard box is packed in the wood box in accordance with Drawing 10001-2113536.	

PACKAGED COMMODITY: M1A2 Cryptographic Equipment Destroyer M606, 1375-00-460-7985	

Proper Shipping Name: Ammunition, Incendiary	
United Nations Number: 0010	
United Nations Packing Group: II	
Physical State: Solid	
Amount Per Container: 1	
Net Weight: 17.2 kg (37.8 pounds)	

PACKAGED COMMODITY USED FOR TEST: Name: Aluminum weights Physical State: Solid	
Size :.04m Dia x .08m L (1.75" Dia x 3.31" L)	
Quantity : 48	
Net Weight: 19.8 kg (43.8 pounds)	
Dunnage: Polyethylene foam	